

# **CITY OF WHEATLAND**

## **GENERAL PLAN UPDATE INTERNAL DRAINAGE MASTER PLAN COST ALLOCATION TECHNICAL REPORT**



**Prepared November 30, 2005  
Adopted July 11, 2006**

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**INTERNAL DRAINAGE MASTER PLAN  
WHEATLAND GENERAL PLAN UPDATE  
COST ALLOCATION TECHNICAL REPORT**  
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## **EXECUTIVE SUMMARY**

### **General**

The Wheatland General Plan Update (GPU) is a proposed mixed use urban development consisting of residential, commercial, industrial, office, open space, roads, parks, schools and a civic center. Included within the Project site will be a portion of the proposed north-south Highway 65 (HWY65) bypass.

Using the Preferred Land Use Map, the various Land Use blocks were assigned a "village" number.

The proposed GPU land uses are shown on Figure 1, and summarized in Table 1.

A summary of approximate areas are as follows:

GPU: Internal drainage demand areas	3,469 acres *
<u>Urban reserve areas (UR)</u>	<u>4,736 acres *</u>
Total GPU area	8,205 acres *
Existing City Limits: Internal drainage demand areas	<u>480 acres</u>
Total GPU area + City Limits	8,685 acres

\* Area does not include existing UPRR and existing Highway 65

### **Internal and External Drainage**

There are two drainage concerns that affect Wheatland:

1. One is the Internal Drainage (ID) that occurs due to rainfall and runoff that lands on the areas between the levees of the Bear River, San Joaquin Drainage Canal and Dry Creek.
2. The second drainage concern is External Drainage (ED) that is to be contained within the embankment levees of the Bear River, San Joaquin Drainage Canal, and Dry Creek. External drainage facilities needed to protect the Wheatland and GPU area and costs are addressed in a separate report.

For the purpose of this Internal Drainage Master Plan Report – Cost Allocation Technical Report (IDMP-CATR), the external drainage is assumed to be contained within the levees of the Bear River, San Joaquin Drainage Canal, and Dry Creek. Drainage from these areas does not affect the internal drainage system.

This Report only addresses the internal drainage facilities.

### **Internal Drainage System**

Civil Solutions prepared the "Draft Drainage Report for Internal Drainage", dated November 2005. This report included items and quantities for physical facilities needed for four (4) alternate methods that were studied to provide drainage for the GPU area. The City GPU Steering Committee in November 2005 selected Alternative 4 known as "The Five Watershed Plan" (Plan) as the plan to be used for the GPU area.

The proposed internal drainage system consists of drain pipes and culverts, channels, and five detention basins each with a pump discharge system. The size, location, and "id" number of the major internal drainage facilities required is shown on Figure 2 and is per the Civil Solutions Drainage Report.

### **System Cost**

The GPU major internal drainage system costs summarized from Report Table 2 are as follows:

<b>Location of Internal Drainage Facility</b>	<b>Adjusted Cost</b>
GPU: Outside City limits	\$94,386,054
<u>Urban reserve (UR)</u>	\$ 0
<b>Total GPU area</b>	<b>\$94,386,054</b>
Existing City Limit Costs	\$ 465,841*
<b>Total GPU area + City Limits</b>	<b>\$94,851,895</b>

- \* The existing City amount is for facilities near Village 160 and 167 that provide drainage for these villages, and \$126,750 for a flood wall and sump to protect a trailer park near 6<sup>th</sup> street on the south side of town.

Cost associated with each of the watersheds and summarized from Report Table 4 are as follows:

<b>Location of Watershed</b>	<b>Adjusted Cost</b>
To NE Detention:	\$14,277,289
To SE Detention:	\$24,998,948
To N Detention Improve:	\$ 4,524,603
To NW Detention:	\$22,442,561
<u>To SW Detention:</u>	<u>\$28,607,493</u>
Total	\$94,851,895

### **Allocation of System Costs**

Major Drainage facility costs are allocated to each village based on a village's impervious acreage to the total impervious acreage that is associated and assigned to a drainage item cost.

Report Table 3 includes a summary by land use types and the total associated cost using the above methodology.

### **Other Items to be Addressed**

The following items need to be considered when developing financing methods for drainage facilities:

1. A method to fund the annual maintenance and operation costs including replacement fund for the major internal facilities including detention basins and pumping facilities.
2. Best Management Practice (BMP) facilities need to be provided including a method to fund the annual maintenance and operation costs including replacement fund.
3. The external drainage system and associated costs is addressed in a separate report, and needs to include a method to fund the annual maintenance and operation costs including replacement fund.

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## **I. INTRODUCTION**

### **General**

The Wheatland General Plan Update (GPU) is a proposed mixed use urban development area located on approximately 8205-acres surrounding the existing City of Wheatland's corporate boundary. The area is currently in the unincorporated area of southern Yuba County and within the City's Sphere of Influence (SOI). The GPU is in general located between Dry Creek on the north, Bear River on the South, Jasper Lane on the east, and the existing sphere of influence limits of Wheatland on the west. The area is proposed to eventually be annexed to the City and developed. The project site is shown, along with its relationship to the existing City and proposed GPU land uses on Figure 1.

The GPU area currently is sparsely developed as farmland except on the west side where some large lot residential areas are located.

The GPU area will eventually be annexed into the City. Thus, the land use entitlement process will be under the jurisdiction of the City, which will serve as the lead agency.

### **Internal and External Drainage**

There are two drainage concerns that affect Wheatland:

1. One is the Internal Drainage (ID) that occurs due to rainfall and runoff that lands on the areas between the levees of the Bear River, San Joaquin Drainage Canal and Dry Creek.
2. The second drainage concern is External Drainage (ED) that is to be contained within the embankment levees of the Bear River, San Joaquin Drainage Canal, and Dry Creek. External drainage facilities needed to protect the Wheatland and GPU area and costs are addressed in a separate report.

For the purpose of this Internal Drainage Master Plan Report – Cost Allocation Technical Report (IDMP-CATR), the ED is assumed to be contained within the levees of the Bear River, San Joaquin Drainage Canal, and Dry Creek. Drainage from these areas does not affect the internal drainage system.

### **Project Description**

The GPU proposes mixed-use urban development consisting of residential, commercial, industrial, office, open space, roads, parks, schools and a civic center. Included within the Project site will be a portion of the proposed north-south Highway 65 (HWY65) bypass.

Using the Preferred Land Use Map, the various land use blocks were assigned a "village" number.

The proposed GPU land uses are shown on Figure 1, and summarized in Table 1.

A summary of approximate areas are as follows:

GPU: Internal drainage demand areas	3,469 acres *
<u>Urban reserve areas (UR)</u>	<u>4,736 acres *</u>
Total GPU area	8,205 acres *
Existing City Limits: Internal drainage demand areas	<u>480 acres</u>
Total GPU area + City Limits	8,685 acres

\* Area does not include existing UPRR and existing Highway 65

Note that the GPU acreage used in this report does not include the existing area inside the City limits drainage system except for two locations: one location adjacent to the southeast side of the UPRR; and one at the existing northwest City limits detention basin. The GPU area does include the urban reserve (UR) area existing drainage demands which are primarily undeveloped, but no drainage costs are assigned to the UR areas at this time.

#### **Purpose of Preliminary Internal Drainage Master Plan**

Civil Solutions prepared the "Draft Drainage Report for Internal Drainage", dated November 2005. This report included items and quantities for physical facilities needed for four (4) alternate methods that were studied to provide drainage for the GPU area. The City GPU Steering Committee in November 2005 selected the Alternate 4 method known as "The Five Watershed Plan" (Plan) to be used for the GPU area.

The purpose of this GPU Internal Drainage Master Plan – Cost Allocation Technical Report (IDMP-CATR) is to utilizing Civil Solutions "Plan" relative to major internal drainage facilities to:

1. Provide a cost estimate to construct the major internal drainage system facilities needed;
2. Provide a method of allocation of cost to the various areas for use in a financing section of the GPU;
3. Provide a summary of the report that can be used in the GPU general report.

The Plan is preliminary and subject to modification and change during processing of the GPU through the City and in response to other agency, developer, community, public comments and reviews, and environmental issues.

If internal drainage areas change because of adjustments in land uses, the issues to be addressed related to the drainage system will be the same but to a lesser or greater extent dependent on the adjustments made. However, even if changes occur, the basic framework in the IDMP-CATR can be readily adjusted to recalculate and address the changes.

Not included in this report are external drainage (ED) facilities or costs needed to protect the GPU area from the Bear River, San Joaquin Drainage Canal, or Dry Creek flows. The ED facilities, costs, and cost allocations are addressed in a separate report for the GPU. The ultimate improvements for the ED will be addressed by Reclamation Districts 817 and 2103.

## **II. JURISDICTIONAL DRAINAGE AGENCIES**

### **General**

The City of Wheatland will be the owner and operator of the major internal drainage systems and related facilities.

Reclamation Districts 817 and 2103 will be the owners and operators of the major external drainage facilities.

## **III. INTERNAL DRAINAGE DEMANDS**

The Alternate 4 method known as "The Five Watershed Plan" (Plan) identified major facilities needed, included the following criteria to be used and other considerations to size the major internal drainage facilities:

1. The external drainage facility levees of the Bear River, San Joaquin Drainage Canal, and Dry Creek are or will be made adequate to protect the GPU areas from external flows and flooding.
2. The major internal drainage facilities for the GPU study area are sized to handle drainage quantities under post development conditions, except for Urban Reserve (UR) areas which consider only existing condition drainage. The UR areas are primarily undeveloped at this time. The UR areas, when developed will be required to mitigate any increase in flows due to development.
3. The Plan provides for each shed major channels, major road culverts, and road crossings to handle the 100-year post development flows. Detention basins are provided at the downstream end of each shed and designed to reduce flows to quantities acceptable for discharge, using pumping facilities, to the Bear River or Dry Creek as indicated in the Plan.
4. Because of timing issues relative to when a shed is to be developed, and possible affects on another shed or sheds, a comprehensive drainage analysis and report will be required to be prepared for each shed when that shed is proposed for development.

Table 1 provides a summary by land use type, impervious areas and equivalent developed dwelling units (EDU's) for the GPU area. One EDU is defined as the amount of impervious area associated with a developed single family detached residential lot, or one (1) EDU is equivalent to 5895 square feet of impervious area (includes an assumed ½ width of road frontage pavement in a subdivision). Demands included in Table 1 have been developed for the City of Wheatland based on City characteristics and from other similar areas within the Sacramento Valley.

Since the drainage demands used to develop the internal major infrastructure is based on proposed developed conditions and densities, the flows used to size the major internal drainage facilities will be related to a villages impervious acreage.

Appendix A includes a further breakdown of the drainage areas above by village. Note that the urban reserve designated areas have areas assigned to them at this time as under existing conditions, they contribute to existing drainage flows into and from the GPU areas. Appendix A contains:

1. Figure 1 and 1A of the GPU area with identifying numbers for village areas by location and land use type. The identifying numbers for this report are called villages;
2. Table A1 with each village's identifying number, acreage, number of dwelling units if applicable, the land use type, and proposed impervious area.

The Numbering system used for Figure 1 and 1A and included in Table A1 is described as follows:

The GPU area was divided into 4 quadrants as follows:

The 100 quadrant:

Is located north of Wheatland Road and west of existing HWY65  
Numbers 160 and up represent areas inside existing City limits.

The 200 quadrant:

Is located north of Spenceville Road and east of existing HWY65  
Numbers 260 and up represent areas inside existing City limits.

The 300 quadrant:

Is located south of Wheatland Road and west of existing HWY65  
Numbers 360 and up represent areas inside existing City limits.

The 400 quadrant:

Is located south of Spenceville Road and east of existing HWY65  
Numbers 460 and up represent areas inside existing City limits.

## IV. MAJOR INTERNAL DRAINAGE SYSTEM

### General

The proposed major internal drainage system per the preferred "Five Watershed Plan" consists of drain pipes, culverted road crossings, channels, and five detention basins with discharge pumping facilities. The size, location, and "id" number of the major internal drainage facilities required is shown on Figure 2 and is per the Civil Solutions Plan, Alternate 4 Plan.

### Drainage Components

Proposed drainage component parts, lineal feet of pipe or drainage item are tabulated in Appendix C, Table C1.

### Drainage Item Labeling

Drainage item number label and location method corresponds to the quadrant number system noted above.

Figure 2 shows the major internal drainage facilities by location, type, and the item number for each major drainage facility.

## V. COST ESTIMATE

For the GPU area, the opinion of probable construction cost for the major internal drainage system as adjusted is \$94,851,895 and includes the cost of drain lines, culverts, manholes, drain inlets, headwalls and rip rap where applicable, detention basins and discharge pumping systems, channel excavation and construction, construction of a floodwall at one location, and land cost. Land costs were assigned to detention basins new channel locations, and existing channel locations to be modified based on the estimated right-of-way width needed to accommodate the channel and a side maintenance road at a cost of \$200,000/acre.

Acreage needed for channels assumed that 50% of the channel area width was already used as a channel. The channel cross section and depth was assumed related to the channel bottom width and configured as shown in Appendix C, Figure C1.

Acreage used for detention basins was based on Civil Solutions Plan except that the N (north) existing detention basin needed no additional land and only pump system modernization. Included in the detention basin cost, is an additional \$100,000 for the preparation of a shed drainage plan for each shed area needed to be prepared for development in that shed per the Civil Solutions Plan.

Table 2 includes, the drainage item number, number of units (feet of pipe, number of facilities, etc.), unit price, total estimated construction cost and total adjusted cost. The adjusted cost includes 30% added to the estimated construction cost for design, agency plan check and inspection fees, processing, and contingencies.

The unit costs by size and type of drainage facility with a breakdown of what is included in each are summarized in Appendix C, Table C1, and are based on recent costs in the Wheatland and Roseville area for similar work.

The GPU major internal drainage system costs are summarized as follows:

<b>Location of Internal Drainage Facility</b>	<b>Adjusted Cost</b>
GPU: Outside City limits	\$94,386,054
<u>Urban reserve (UR)</u>	\$ 0
<b>Total GPU area</b>	<b>\$94,386,054</b>
Existing City Limit Costs	\$ 465,841*
<b>Total GPU area + City Limits</b>	<b>\$94,851,895</b>

- 
- \* The existing City amount is for facilities near Village 160 and 167 that provide diversion of drainage from these villages, and for \$126,750 for a flood wall and sump to protect the trailer park near 6<sup>th</sup> street on the south side of town.

The GPU major internal drainage system costs for each of the preferred plan five watersheds are summarized from Table 4 as follows:

<b>Location of Watershed</b>	<b>Adjusted Cost</b>
To NE Detention:	\$14,277,289
To SE Detention:	\$24,998,948
To N Detention Improve:	\$ 4,524,603
To NW Detention:	\$22,442,561
<u>To SW Detention:</u>	<u>\$28,607,493</u>
Total	\$94,851,895

## VI. COST ALLOCATION

Major Drainage facility costs are allocated to each village based on the criteria outlined below:

1. Internal drainage culverts crossing four-lane major road sections:
  - a. Costs are allocated to each outside village based on the ratio of a village's acreage to the total of all outside villages acreage times the drainage item cost.
2. All other internal drainage facilities are assigned to villages as follows:
  - a. Costs are allocated to each outside village that drains through or to a facility based on the ratio of the village's impervious acreage to the total of all contributing villages impervious acreage times the drainage item cost except as noted in "b" below.
  - b. The existing City amount allocation is for facilities near Village 160 and 167 that provide diversion of drainage from these villages, and for \$126,750 for a flood wall and sump to protect the trailer park near 6<sup>th</sup> street on the south side of town.

Table 3 includes a summary by land use types and the total associated costs using the above methodology.

Appendix C, Table C2 contains a breakdown for each village's assignment and share of the major street item costs.

## VII. OTHER ITEMS TO BE CONSIDERED

The following items need to be considered when developing financing methods for drainage facilities:

1. A method to fund the annual maintenance and operation costs including replacement fund for the major internal facilities including detention basins and pumping facilities.
2. Best Management Practice (BMP) facilities need to be provided including a method to fund the annual maintenance and operation costs including replacement fund.
3. The external drainage system and associated costs is addressed in a separate report, and needs to include a method to fund the annual maintenance and operation costs including replacement fund.

## **TABLES**

**TABLE 1**  
**LAND USE SUMMARY**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
**September 12, 2005**

**DRAINAGE**

LAND USE	DESCRIPTION	ACRES	DWELLING UNITS	STORM DRAINAGE		DRAINAGE, impervious area					
				impervious area sf/unit	total acres	HARD SURFACE			EDU's, imperv.		
						%/acre	total sf	total acres	unit	total	
<b>Single Family Residential</b>											
LDR	Low Density Residential	1824.6	7,298	5,895	987.7	48.9%	43,023,832	987.7	1.00	7,298	
PD-3.3	Residential 70' x 130'	0.0	-	6,552	-	52.6%	-	-	1.11	-	
PD-4	Residential 65' x 120'	0.0	-	5,895	-	54.1%	-	-	1.00	-	
PD-4.5	Residential 55' x 110'	0.0	-	5,290	-	54.6%	-	-	0.90	-	
LMDR	Low/Medium Density Res.	434.6	2,173	4,671	233.0	53.6%	10,150,317	233.0	0.79	1,722	
PD-6.6	Residential	0.0	0	4,058	-	55.9%	-	-	0.69	-	
PD-7	Residential	0.0	0	3,687	-	59.2%	-	-	0.63	-	
MDR	Medium Density Residential	256.1	2,049	3,687	173.4	59.2%	7,553,926	173.4	0.63	1,281	
Total Single Family Residential		2515.3	11,520		1,394.1		60,728,074	1,394.1		10,302	
<b>Other</b>											
PD-12	Residential	0.0	-	2,390	-	65.8%	-	-	0.41	-	
HDR	High Density Residential	70.5	1,129	1,936	50.2	80.0%	2,185,047	50.2	0.33	371	
PD-20	Residential	0.0	0	1,742	-	80.0%	-	-	0.30	-	
Total Multi-Family Residential		70.5	1,129		50.2		2,185,047	50.2		371	
Total Residential		2585.8	12,649		1,444.3		62,913,121	1,444.3		10,672	
<b>Other</b>											
C	Commercial	118.6	0	39,204	106.7	90.0%	4,647,634	106.7	6.65	788	
E	Employment	298.9	0	39,204	269.0	90.0%	11,718,860	269.0	6.65	1,988	
BP	Business Professional	0.0	0	39,204	-	90.0%	-	-	6.65	-	
P	Park	99.1	0	10,890	24.8	25.0%	1,079,308	24.8	1.85	183	
Pcp	Community Park	0.0	0	10,890	-	25.0%	-	-	1.85	-	
MS	Middle School	36.9	0	10,890	9.2	25.0%	401,297	9.2	1.85	68	
HS	High School	51.2	0	21,780	25.6	50.0%	1,114,700	25.6	3.69	189	
ES	K-6 School	71.8	0	21,780	35.9	50.0%	1,562,715	35.9	3.69	265	
OS	Open Space	141.8	0	-	-	0.0%	-	-	0.00	-	
ROAD	Roads R/W	0.0	0	32,670	-	75.0%	-	-	5.54	-	
Total Other		818.2	-		471.2		20,524,514	471.2		3,482	
		3404.0	12,649		1,915.5		83,437,635	1,915.5		14,154	
<b>BUSINESS PROFESSIONAL</b>											
CC	Civic Center	21.8	-	39,204	19.6	90.0%	855,039	19.6	6.65	145	
WWTP	Wastewater Plant	29.0	-	39,204	26.1	90.0%	1,135,348	26.1	6.65	193	
PB	Other Public	14.1	-	39,204	12.7	90.0%	553,168	12.7	6.65	94	
LI	Light Industrial	0.0	-	39,204	-	90.0%	-	-	6.65	-	
UR	Urban Reserve	4736.2	-	-	-	0.0%	-	-	0.00	-	
65BP	SR65 Bypass/Interchange	0.0	-	32,670	-	75.0%	-	-	5.54	-	
Total Business Professional		4801.1	-		58.4		2,543,556	58.4		431	
Grand Total General Plan Study Area		8205.1	12,649		1973.9		85,981,191	1973.9		14,585	

landusesum@B10

file: K:\1proj\12xx\1252\GPUusedemands081205.xls

**TABLE 2**  
**DRAINAGE**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE DRAINAGE COSTS**  
**November 28,2005**

**TOTAL COST**

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL	ADJUSTED COST @ 1.3	PART OF \$ TO INSIDE CITY if = 1
<b>DRAINAGE</b>							
100							
101	54 "pipes	1450	LF	\$ 184	\$266,800	\$346,840	0
102	2- 48" pipes	100	LF	\$ 599	\$59,900	\$77,870	0
103	66 "pipes	613	LF	\$ 244	\$149,572	\$194,444	0
104	60 "pipes	2579	LF	\$ 224	\$577,696	\$751,005	0
105	2- 72" pipes	60	LF	\$ 1,168	\$70,080	\$91,104	1
106	54 "pipes	933	LF	\$ 184	\$171,672	\$223,174	0
107	78 "pipes	1867	LF	\$ 444	\$828,948	\$1,077,632	0
108	96 "pipes	2422	LF	\$ 675	\$1,634,850	\$2,125,305	0
109	40' Bottom width channel	1200	LF	\$ 390	\$468,000	\$608,400	0
110	96 "pipes	100	LF	\$ 675	\$67,500	\$87,750	0
111	40' Bottom width channel	3400	LF	\$ 390	\$1,326,000	\$1,723,800	0
112	40' Bottom width channel	4000	LF	\$ 390	\$1,560,000	\$2,028,000	0
113	40' Bottom width channel	1500	LF	\$ 390	\$585,000	\$760,500	0
114	NW Detention	1	EA	\$ 9,397,140	\$9,397,140	\$12,216,282	0
160	N Detention Improve	1	EA	\$ 1,194,300	\$1,194,300	\$1,552,590	1
161	Reconstruct channel @ SR65 Bridge	1	EA	\$ 30,000	\$30,000	\$39,000	1
162	5' Bottom width channel	1720	LF	\$ 170	\$292,400	\$380,120	1
200							
201	2- 72" pipes	100	LF	\$ 1,168	\$116,800	\$151,840	0
202	66 "pipes	2369	LF	\$ 244	\$578,036	\$751,447	0
203	2- 10'x3' RCB	60	LF	\$ 1,163	\$69,780	\$90,714	0
204	2- 10'x4' RCB	60	LF	\$ 1,374	\$82,440	\$107,172	0
205	2- 10'x4' RCB	100	LF	\$ 1,374	\$137,400	\$178,620	0
207	40' Bottom width channel	1500	LF	\$ 390	\$585,000	\$760,500	0
208	40' Bottom width channel	1000	LF	\$ 390	\$390,000	\$507,000	0
209	78 "pipes	1602	LF	\$ 444	\$711,288	\$924,674	0
210	2- 10'x4' RCB	100	LF	\$ 1,374	\$137,400	\$178,620	0
211	3- 8'x5' RCB	100	LF	\$ 1,930	\$193,000	\$250,900	0
212	3- 60" pipes	60	LF	\$ 1,248	\$74,880	\$97,344	0
216	3- 8'x3' RCB	100	LF	\$ 1,402	\$140,200	\$182,260	0
217	1- 5'x4' RCB Extension	50	LF	\$ 725	\$36,250	\$47,125	0
218	54 "pipes	1525	LF	\$ 184	\$280,600	\$364,780	0
219	NE Detention	1	EA	\$ 6,977,800	\$6,977,800	\$9,071,140	0
221	40' Bottom width channel	3700	LF	\$ 390	\$1,443,000	\$1,875,900	0
222	40' Bottom width channel	700	LF	\$ 390	\$273,000	\$354,900	0
223	40' Bottom width channel	1300	LF	\$ 390	\$507,000	\$659,100	0

**TABLE 2**  
**DRAINAGE**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE DRAINAGE COSTS**  
**November 28,2005**

**TOTAL COST**

ITEM NO.		DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL	ADJUSTED COST @ 1.3	PART OF \$ TO INSIDE CITY if = 1
<b>DRAINAGE</b>								
300								
301		4- 6'x6' RCB	100	LF	\$ 2,311	\$231,100	\$300,430	0
302		90 "pipes	1114	LF	\$ 607	\$676,198	\$879,057	0
303		5- 6'x5' RCB	100	LF	\$ 2,499	\$249,900	\$324,870	0
304		78 "pipes	674	LF	\$ 444	\$299,256	\$389,033	0
305		48 "pipes	1309	LF	\$ 138	\$180,642	\$234,835	0
306		84 "pipes	2422	LF	\$ 540	\$1,307,880	\$1,700,244	0
307		72 "pipes	2416	LF	\$ 379	\$915,664	\$1,190,363	0
308		72 "pipes	1246	LF	\$ 379	\$472,234	\$613,904	0
309		Extend existing 11'x6' CMP arch	40	LF	\$ 200	\$8,000	\$10,400	0
310		3- 9'x6' RCB	90	LF	\$ 2,407	\$216,630	\$281,619	0
311		3- 7'x6' RCB	60	LF	\$ 1,982	\$118,920	\$154,596	0
312		40' Bottom width channel	300	LF	\$ 390	\$117,000	\$152,100	0
313		40' Bottom width channel	5300	LF	\$ 390	\$2,067,000	\$2,687,100	0
314		40' Bottom width channel	2000	LF	\$ 390	\$780,000	\$1,014,000	0
315		40' Bottom width channel	3500	LF	\$ 390	\$1,365,000	\$1,774,500	0
316		40' Bottom width channel	1900	LF	\$ 390	\$741,000	\$963,300	0
317		SW Detention	1	EA	\$ 12,234,780	\$12,234,780	\$15,905,214	0
400		SE Detention	1	EA	\$ 15,916,400	\$15,916,400	\$20,691,320	0
401		2- 10'x6' RCB	60	LF	\$ 1,794	\$107,640	\$139,932	0
402		84 "pipes	2183	LF	\$ 540	\$1,178,820	\$1,532,466	0
403		84 "pipes	1737	LF	\$ 540	\$937,980	\$1,219,374	0
404		4- 6'x5' RCB	60	LF	\$ 2,027	\$121,620	\$158,106	0
406		20' Bottom width channel	3000	LF	\$ 290	\$870,000	\$1,131,000	0
460		4- 6'x6' RCB	60	LF	\$ 2,311	\$138,660	\$180,258	0
461		3'?-high floodwall at trailer park	1300	LF	\$ 75	\$97,500	\$126,750	1
462		40' Bottom width channel	300	LF	\$ 390	\$117,000	\$152,100	0
			67707		TOTAL	\$72,962,996	\$94,851,895	\$ 465,841

file: K:\1proj\12xx\1252\GPUusedemands081205.xls

Sheet: DRAINAGE @ A1

Source: Terrance E. Lowell & Associates

**TABLE 3**  
**LAND USE SUMMARY**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
**September 12, 2005**

**DRAINAGE**

LAND USE	DESCRIPTION	ACRES	DWELLING UNITS	STORM DRAINAGE		ALLOCATED COSTS DRAINAGE
				impervious area sf/unit	total acres	
<b>Total Adjusted Cost</b>						
<b>Single Family Residential</b>						
LDR	Low Density Residential	1824.6	7,298	5,895	987.7	\$ 45,446,222
PD-3.3	Residential 70' x 130'	0.0	-	6,552	-	\$ -
PD-4	Residential 65' x 120'	0.0	-	5,895	-	\$ -
PD-4.5	Residential 55' x 110'	0.0	-	5,290	-	\$ -
LMDR	Low/Medium Density Res.	434.6	2,173	4,671	233.0	\$ 12,618,163
PD-6.6	Residential	0.0	0	4,058	-	\$ -
PD-7	Residential	0.0	0	3,687	-	\$ -
MDR	Medium Density Residential	256.1	2,049	3,687	173.4	\$ 9,396,846
<b>Total Single Family Residential</b>		2515.3	11,520		1,394.1	\$ 67,461,230
<b>Other</b>						
PD-12	Residential	0.0	-	2,390	-	\$ -
HDR	High Density Residential	70.5	1,129	1,936	50.2	\$ 2,248,466
PD-20	Residential	0.0	0	1,742	-	
<b>Total Multi-Family Residential</b>		70.5	1,129		50.2	\$ 2,248,466
<b>Total Residential</b>		2585.8	12,649		1,444.3	\$ 69,709,696
<b>Other</b>						
C	Commercial	118.6	0	39,204	106.7	\$ 5,525,731
E	Employment	298.9	0	39,204	269.0	\$ 11,950,581
BP	Business Professional	0.0	0	39,204	-	\$ -
P	Park	99.1	0	10,890	24.8	\$ 1,449,358
Pcp	Community Park	0.0	0	10,890	-	\$ -
MS	Middle School	36.9	0	10,890	9.2	\$ 514,252
HS	High School	51.2	0	21,780	25.6	\$ 862,202
ES	K-6 School	71.8	0	21,780	35.9	\$ 1,691,794
OS	Open Space	141.8	0	-	-	\$ -
ROAD	Roads R/W	0.0	0	32,670	-	\$ -
<b>Total Other</b>		818.2	-		471.2	\$ 21,993,918
		3404.0	12,649		1,915.5	\$ 91,703,614
<b>BUSINESS PROFESSIONAL</b>						
CC	Civic Center	21.8	-	39,204	19.6	\$ 686,672
WWTP	Wastewater Plant	29.0	-	39,204	26.1	\$ 1,669,878
PB	Other Public	14.1	-	39,204	12.7	\$ 791,731
LI	Light Industrial	0.0	-	39,204	-	\$ -
UR	Urban Reserve	4736.2	-	-	-	\$ -
65BP	SR65 Bypass/Interchange	0.0	-	32,670	-	\$ -
<b>Total Business Professional</b>		4801.1	-		58.4	\$ 3,148,281
<b>Grand Total General Plan Study Area</b>		8205.1	12,649		1973.9	\$ 94,851,895

landusesum@B10

file: K:\1pro\12xx\1252\GPUusedemands081205.xls

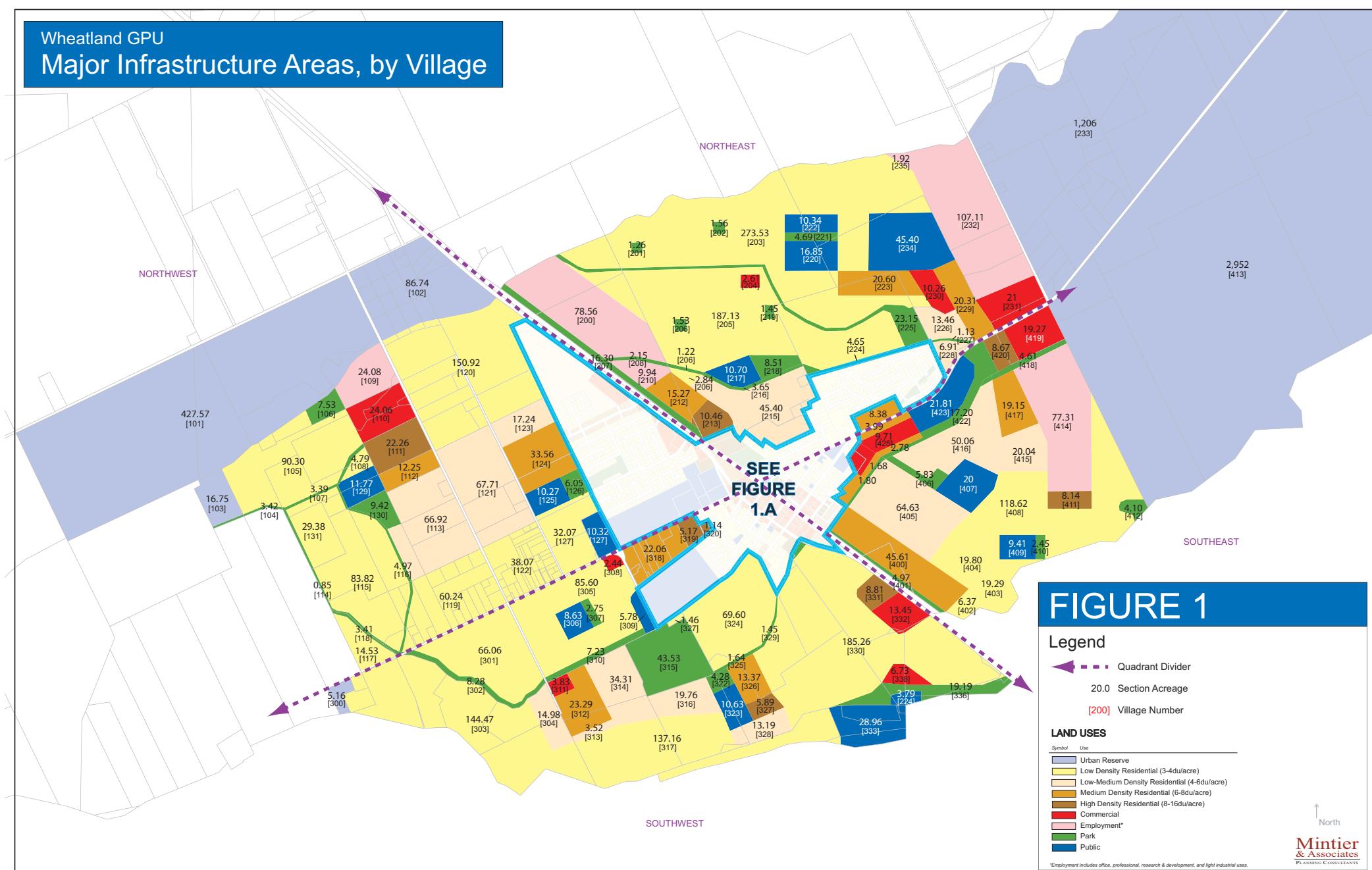
**TABLE 4**  
**DRAINAGE**  
**WHEATLAND GPU**  
**MAJOR DRAINAGE SYSTEM COSTS SUMMARY BY WATERSHED**  
**November 28, 2005**

	NE Detention	SE Detention	N Detention Improve	NW Detention	SW Detention	TOTAL
	TOTAL ADJUSTED COSTS WITHIN WATERSHED LOCATION					Adj. Cost
DET&plan	\$9,071,140	\$20,691,320	\$1,552,590	\$12,216,282	\$15,905,214	\$59,436,546
Channels	\$4,157,400	\$1,131,000	\$419,120	\$5,120,700	\$6,743,100	\$17,571,320
remainder	\$1,048,749	\$3,176,628	\$2,552,893	\$5,106,579	\$ 5,959,179	\$ 17,844,029
Total Cost	\$14,277,289	\$24,998,948	\$4,524,603	\$22,443,561	\$ 28,607,493	\$ 94,851,895

Sheet: DRAINAGE @ GK128

## **FIGURES**

Wheatland GPU  
Major Infrastructure Areas, by Village



# WHEATLAND GENERAL PLAN UPDATE DRAINAGE EXHIBIT ALT. 4

NOVEMBER 30, 2005

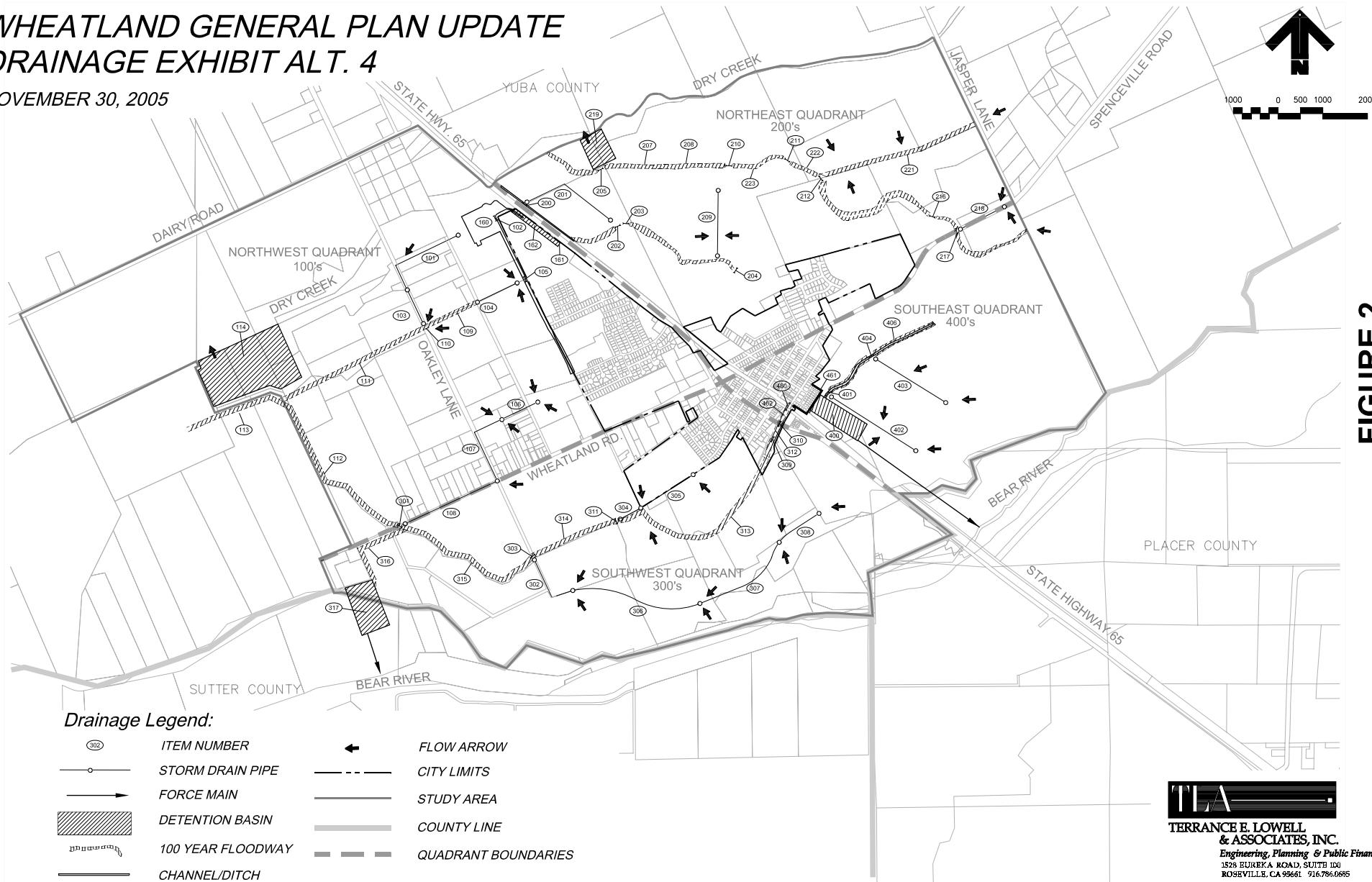


FIGURE 2

**TEA**  
TERRANCE E. LOWELL  
& ASSOCIATES, INC.  
Engineering, Planning & Public Finance  
1528 BURKEA ROAD, SUITE 100  
ROSEVILLE, CA 95661 916.786.0685

## **APPENDIX A**

**TABLE A1**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
September 12, 2005

0

**DRAINAGE DEMANDS**

file: K:\1proj\12xx\1252\GPUUsedemands081205

Sheet: landusepcl2 @ c11 to fw346

VILLAGE NO.	ZONING	DESCRIPTION	ACRES	DWELLING UNITS	DU's/ACRE	DRAINAGE DEMAND		
						Imperviousnes, 1 EDU = sf		
						sf/unit	Total, imp. acres	EDU's
100	UR	Urban Reserve	0.00	0	0.00	-	0.0	-
101	UR	Urban Reserve	427.57	0	0.00	-	0.0	-
102	UR	Urban Reserve	86.74	0	0.00	-	0.0	-
103	UR	Urban Reserve	16.75	0	0.00	-	0.0	-
104	OS	Open Space	3.42	0	0.00	-	0.0	-
105	LDR	Low Density Residential	90.30	361	4.00	5,895	48.9	361
106	P	Park	7.53	0	0.00	10,890	1.9	14
107	OS	Open Space	3.39	0	0.00	-	0.0	-
108	LDR	Low Density Residential	4.79	19	4.00	5,895	2.6	19
109	E	Employment	24.08	0	0.00	39,204	21.7	160
110	C	Commercial	24.06	0	0.00	39,204	21.7	160
111	HDR	High Density Residential	22.26	356	16.00	1,936	15.8	117
112	MDR	Medium Density Residential	12.25	98	8.00	3,687	8.3	61
113	LMDR	Low/Medium Density Res.	66.92	335	5.00	4,671	35.9	265
114	OS	Open Space	0.85	0	0.00	-	0.0	-
115	LDR	Low Density Residential	83.82	335	4.00	5,895	45.4	335
116	OS	Open Space	4.97	0	0.00	-	0.0	-
117	LDR	Low Density Residential	14.53	58	4.00	5,895	7.9	58
118	OS	Open Space	3.41	0	0.00	-	0.0	-
119	LDR	Low Density Residential	60.24	241	4.00	5,895	32.6	241
120	LDR	Low Density Residential	150.92	604	4.00	5,895	81.7	604
121	LMDR	Low/Medium Density Res.	67.71	339	5.00	4,671	36.3	268
122	LDR	Low Density Residential	38.07	152	4.00	5,895	20.6	152
123	LMDR	Low/Medium Density Res.	17.24	86	5.00	4,671	9.2	68
124	MDR	Medium Density Residential	33.56	268	8.00	3,687	22.7	168
125	ES	K-6 School	10.27	0	0.00	21,780	5.1	38
126	P	Park	6.05	0	0.00	10,890	1.5	11
127	LDR	Low Density Residential	32.07	128	4.00	5,895	17.4	128
128	PB	Other Public	10.32	0	0.00	39,204	9.3	69
129	ES	K-6 School	11.77	0	0.00	21,780	5.9	43
130	P	Park	9.42	0	0.00	10,890	2.4	17
131	LDR	Low Density Residential	29.38	118	4.00	5,895	15.9	118
160	LMDR	Low/Medium Density Res.	44.61	223	5.00	4,671	23.9	177
161	MDR	Medium Density Residential	0.36	3	8.00	3,687	0.2	2
162	MDR	Medium Density Residential	1.19	10	8.00	3,687	0.8	6
163	LDR	Low Density Residential	1.74	7	4.00	5,895	0.9	7
164	LDR	Low Density Residential	2.37	9	4.00	5,895	1.3	9
165	LDR	Low Density Residential	1.33	5	4.00	5,895	0.7	5
166	MDR	Medium Density Residential	2.17	17	8.00	3,687	1.5	11
167	C	Commercial	6.34	0	0.00	39,204	5.7	42
168	MDR	Medium Density Residential	0.91	7	8.00	3,687	0.6	5
169	LDR	Low Density Residential	1.21	5	4.00	5,895	0.7	5
170	MDR	Medium Density Residential	0.81	6	8.00	3,687	0.5	4
171	MDR	Medium Density Residential	0.88	7	8.00	3,687	0.6	4
172	MDR	Medium Density Residential	0.84	7	8.00	3,687	0.6	4
173	LDR	Low Density Residential	0.43	2	4.00	5,895	0.2	2
174	C	Commercial	0.63	0	0.00	39,204	0.6	4
175	C	Commercial	0.59	0	0.00	39,204	0.5	4
176	LDR	Low Density Residential	11.84	47	4.00	5,895	6.4	47
177	P	Park	5.63	0	0.00	10,890	1.4	10
178	LDR	Low Density Residential	0.79	3	4.00	5,895	0.4	3

**TABLE A1**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
September 12, 2005

0

**DRAINAGE DEMANDS**

file: K:\1proj\12xx\1252\GPUUsedemands081205

Sheet: landusepcl2 @ c11 to fw346

VILLAGE NO.	ZONING	DESCRIPTION	ACRES	DWELLING UNITS	DU's/ACRE	DRAINAGE DEMAND		
						Imperviousnes, 1 EDU = sf		5,895
						sf/unit	Total, imp. acres	EDU's
179	LDR	Low Density Residential	10.36	41	4.00	5,895	5.6	41
180	LDR	Low Density Residential	9.57	38	4.00	5,895	5.2	38
181	LDR	Low Density Residential	9.72	39	4.00	5,895	5.3	39
182	C	Commercial	5.76	0	0.00	39,204	5.2	38
183	MDR	Medium Density Residential	0.30	2	8.00	3,687	0.2	2
184	LDR	Low Density Residential	13.67	55	4.00	5,895	7.4	55
185	C	Commercial	1.83	0	0.00	39,204	1.6	12
186	MS	Middle School	30.98	0	0.00	10,890	7.7	57
187	MS	Middle School	4.28	0	0.00	10,890	1.1	8
188	HDR	High Density Residential	1.88	30	16.00	1,936	1.3	10
189	MS	Middle School	7.45	0	0.00	10,890	1.9	14
192	LDR	Low Density Residential	0.94	4	4.00	5,895	0.5	4
193	MDR	Medium Density Residential	0.37	3	8.00	3,687	0.3	2
194	MDR	Medium Density Residential	0.41	3	8.00	3,687	0.3	2
195	C	Commercial	0.52	0	0.00	39,204	0.5	3
						-		
200	E	Employment	78.56	0	0.00	39,204	70.7	522
201	P	Park	1.26	0	0.00	10,890	0.3	2
202	P	Park	1.56	0	0.00	10,890	0.4	3
203	LDR	Low Density Residential	273.53	1094	4.00	5,895	148.1	1,094
204	C	Commercial	2.61	0	0.00	39,204	2.3	17
205	LDR	Low Density Residential	187.13	749	4.00	5,895	101.3	749
206	P	Park	1.53	0	0.00	10,890	0.4	3
207	OS	Open Space	16.30	0	0.00	-	0.0	-
208	OS	Open Space	2.15	0	0.00	-	0.0	-
209	OS	Open Space	1.22	0	0.00	-	0.0	-
210	E	Employment	9.94	0	0.00	39,204	8.9	66
211	LDR	Low Density Residential	2.84	11	4.00	5,895	1.5	11
212	MDR	Medium Density Residential	15.27	122	8.00	3,687	10.3	76
213	HDR	High Density Residential	10.46	167	16.00	1,936	7.4	55
214	MDR	Medium Density Residential	3.49	28	8.00	3,687	2.4	17
215	LMDR	Low/Medium Density Res.	45.40	227	5.00	4,671	24.3	180
216	OS	Open Space	3.65	0	0.00	-	0.0	-
217	ES	K-6 School	10.70	0	0.00	21,780	5.4	40
218	P	Park	8.51	0	0.00	10,890	2.1	16
219	P	Park	1.45	0	0.00	10,890	0.4	3
220	MS	Middle School	16.85	0	0.00	10,890	4.2	31
221	P	Park	4.69	0	0.00	10,890	1.2	9
222	ES	K-6 School	10.34	0	0.00	21,780	5.2	38
223	MDR	Medium Density Residential	20.60	165	8.00	3,687	13.9	103
224	OS	Open Space	4.65	0	0.00	-	0.0	-
225	OS	Open Space	23.15	0	0.00	-	0.0	-
226	LMDR	Low/Medium Density Res.	13.46	67	5.00	4,671	7.2	53
227	OS	Open Space	1.13	0	0.00	-	0.0	-
228	LMDR	Low/Medium Density Res.	6.91	35	5.00	4,671	3.7	27
229	MDR	Medium Density Residential	20.31	162	8.00	3,687	13.8	102
230	C	Commercial	10.26	0	0.00	39,204	9.2	68
231	C	Commercial	21.00	0	0.00	39,204	18.9	140
232	E	Employment	107.11	0	0.00	39,204	96.4	712
233	UR	Urban Reserve	1250.00	0	0.00	-	0.0	-
234	HS	High School	45.40	0	0.00	21,780	22.7	168
235	E	Employment	1.92	0	0.00	39,204	1.7	13

**TABLE A1**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
September 12, 2005

0

**DRAINAGE DEMANDS**

file: K:\1proj\12xx\1252\GPUUsedemands081205

Sheet: landusepcl2 @ c11 to fw346

VILLAGE NO.	ZONING	DESCRIPTION	ACRES	DWELLING UNITS	DU's/ACRE	DRAINAGE DEMAND		
						Imperviousnes, 1 EDU = sf		5,895
						sf/unit	Total, imp. acres	EDU's
236	LDR	Low Density Residential	0.92	4	4.00	5,895	0.5	4
237	MDR	Medium Density Residential	8.38	67	8.00	3,687	5.7	42
238	LDR	Low Density Residential	2.36	9	4.00	5,895	1.3	9
260	HDR	High Density Residential	6.92	111	16.00	1,936	4.9	36
261	P	Park	4.50	0	0.00	10,890	1.1	8
262	LDR	Low Density Residential	1.05	4	4.00	5,895	0.6	4
263	C	Commercial	1.68	0	0.00	39,204	1.5	11
264	LDR	Low Density Residential	1.91	8	4.00	5,895	1.0	8
265	LDR	Low Density Residential	2.51	10	4.00	5,895	1.4	10
266	LDR	Low Density Residential	4.48	18	4.00	5,895	2.4	18
267	LMDR	Low/Medium Density Res.	12.00	60	5.00	4,671	6.4	48
268	LDR	Low Density Residential	2.85	11	4.00	5,895	1.5	11
269	LDR	Low Density Residential	2.71	11	4.00	5,895	1.5	11
270	LDR	Low Density Residential	1.59	6	4.00	5,895	0.9	6
271	LDR	Low Density Residential	7.83	31	4.00	5,895	4.2	31
272	LDR	Low Density Residential	2.24	9	4.00	5,895	1.2	9
273	LDR	Low Density Residential	2.50	10	4.00	5,895	1.4	10
274	LDR	Low Density Residential	3.78	15	4.00	5,895	2.0	15
275	LDR	Low Density Residential	3.95	16	4.00	5,895	2.1	16
276	LDR	Low Density Residential	2.94	12	4.00	5,895	1.6	12
277	P	Park	0.29	0	0.00	10,890	0.1	1
278	LDR	Low Density Residential	1.56	6	4.00	5,895	0.8	6
279	P	Park	1.19	0	0.00	10,890	0.3	2
280	LDR	Low Density Residential	1.02	4	4.00	5,895	0.6	4
281	LDR	Low Density Residential	2.47	10	4.00	5,895	1.3	10
282	LDR	Low Density Residential	2.46	10	4.00	5,895	1.3	10
283	P	Park	1.12	0	0.00	10,890	0.3	2
284	LDR	Low Density Residential	1.36	5	4.00	5,895	0.7	5
285	LDR	Low Density Residential	1.74	7	4.00	5,895	0.9	7
286	LDR	Low Density Residential	6.01	24	4.00	5,895	3.3	24
287	LDR	Low Density Residential	2.25	9	4.00	5,895	1.2	9
288	LDR	Low Density Residential	7.40	30	4.00	5,895	4.0	30
289	LDR	Low Density Residential	7.76	31	4.00	5,895	4.2	31
						-		
300	UR	Urban Reserve	5.16	0	0.00	-	0.0	-
301	LDR	Low Density Residential	66.06	264	4.00	5,895	35.8	264
302	OS	Open Space	8.28	0	0.00	-	0.0	-
303	LDR	Low Density Residential	144.47	578	4.00	5,895	78.2	578
304	LMDR	Low/Medium Density Res.	14.98	75	5.00	4,671	8.0	59
305	LDR	Low Density Residential	85.60	342	4.00	5,895	46.3	342
306	ES	K-6 School	8.63	0	0.00	21,780	4.3	32
307	P	Park	2.75	0	0.00	10,890	0.7	5
308	C	Commercial	2.44	0	0.00	39,204	2.2	16
309	HS	High School	5.78	0	0.00	21,780	2.9	21
310	OS	Open Space	7.23	0	0.00	-	0.0	-
311	C	Commercial	3.83	0	0.00	39,204	3.4	25
312	MDR	Medium Density Residential	23.29	186	8.00	3,687	15.8	117
313	MDR	Medium Density Residential	3.52	28	8.00	3,687	2.4	18
314	LMDR	Low/Medium Density Res.	34.31	172	5.00	4,671	18.4	136
315	P	Park	43.53	0	0.00	10,890	10.9	80
316	LMDR	Low/Medium Density Res.	19.76	99	5.00	4,671	10.6	78
317	LDR	Low Density Residential	137.16	549	4.00	5,895	74.2	549

**TABLE A1**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
September 12, 2005

0

**DRAINAGE DEMANDS**

file: K:\1proj\12xx\1252\GPUUsedemands081205

Sheet: landusepcl2 @ c11 to fw346

VILLAGE NO.	ZONING	DESCRIPTION	ACRES	DWELLING UNITS	DU's/ACRE	DRAINAGE DEMAND		
						Imperviousnes, 1 EDU = sf		5,895
						sf/unit	Total, imp. acres	EDU's
318	MDR	Medium Density Residential	22.06	176	8.00	3,687	14.9	110
319	HDR	High Density Residential	5.17	83	16.00	1,936	3.7	27
320	HDR	High Density Residential	1.14	18	16.00	1,936	0.8	6
321	LDR	Low Density Residential	1.46	6	4.00	5,895	0.8	6
322	P	Park	4.28	0	0.00	10,890	1.1	8
323	ES	K-6 School	10.63	0	0.00	21,780	5.3	39
324	LDR	Low Density Residential	69.60	278	4.00	5,895	37.7	278
325	OS	Open Space	1.64	0	0.00	-	0.0	-
326	MDR	Medium Density Residential	13.37	107	8.00	3,687	9.1	67
327	HDR	High Density Residential	5.89	94	16.00	1,936	4.2	31
328	LMDR	Low/Medium Density Res.	13.19	66	5.00	4,671	7.1	52
329	OS	Open Space	1.45	0	0.00	-	0.0	-
330	LDR	Low Density Residential	185.26	741	4.00	5,895	100.3	741
331	HDR	High Density Residential	8.81	141	16.00	1,936	6.3	46
332	C	Commercial	13.45	0	0.00	39,204	12.1	89
333	WWTP	Wastewater Plant	28.96	0	0.00	39,204	26.1	193
334	PB	Other Public	3.79	0	0.00	39,204	3.4	25
335	C	Commercial	6.73	0	0.00	39,204	6.1	45
336	OS	Open Space	19.19	0	0.00	-	0.0	-
360	HS	High School	34.08	0	0.00	21,780	17.0	126
361	LDR	Low Density Residential	2.32	9	4.00	5,895	1.3	9
362	LDR	Low Density Residential	6.70	27	4.00	5,895	3.6	27
364	LDR	Low Density Residential	6.27	25	4.00	5,895	3.4	25
365	C	Commercial	0.23	0	0.00	39,204	0.2	2
366	C	Commercial	0.52	0	0.00	39,204	0.5	3
367	LDR	Low Density Residential	1.39	6	4.00	5,895	0.8	6
368	LDR	Low Density Residential	8.62	34	4.00	5,895	4.7	34
369	PB	Other Public	0.62	0	0.00	39,204	0.6	4
370	LDR	Low Density Residential	1.43	6	4.00	5,895	0.8	6
371	LDR	Low Density Residential	0.99	4	4.00	5,895	0.5	4
372	LDR	Low Density Residential	1.11	4	4.00	5,895	0.6	4
373	LDR	Low Density Residential	3.73	15	4.00	5,895	2.0	15
374	MDR	Medium Density Residential	0.88	7	8.00	3,687	0.6	4
375	MDR	Medium Density Residential	0.68	5	8.00	3,687	0.5	3
376	LDR	Low Density Residential	7.76	31	4.00	5,895	4.2	31
377	OS	Open Space	0.67	0	0.00	-	0.0	-
378	HDR	High Density Residential	1.96	31	16.00	1,936	1.4	10
379	OS	Open Space	1.18	0	0.00	-	0.0	-
380	C	Commercial	0.51	0	0.00	39,204	0.5	3
381	C	Commercial	0.40	0	0.00	39,204	0.4	3
382	LDR	Low Density Residential	0.11	0	4.00	5,895	0.0	0
383	C	Commercial	0.35	0	0.00	39,204	0.3	2
384	C	Commercial	0.25	0	0.00	39,204	0.2	2
385	PB	Other Public	0.23	0	0.00	39,204	0.2	2
386	PB	Other Public	0.41	0	0.00	39,204	0.4	3
387	C	Commercial	0.49	0	0.00	39,204	0.4	3
388	C	Commercial	0.39	0	0.00	39,204	0.4	3
389	LDR	Low Density Residential	0.66	3	4.00	5,895	0.4	3
						-		
400	MDR	Medium Density Residential	45.61	365	8.00	3,687	30.9	228
401	OS	Open Space	4.97	0	0.00	-	0.0	-
402	LDR	Low Density Residential	6.37	25	4.00	5,895	3.4	25

**TABLE A1**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
September 12, 2005

0

**DRAINAGE DEMANDS**

file: K:\1proj\12xx\1252\GPUUsedemands081205

Sheet: landusepcl2 @ c11 to fw346

VILLAGE NO.	ZONING	DESCRIPTION	ACRES	DWELLING UNITS	DU's/ACRE	DRAINAGE DEMAND		
						Imperviousnes, 1 EDU = sf		5,895
						sf/unit	Total, imp. acres	EDU's
403	LDR	Low Density Residential	19.29	77	4.00	5,895	10.4	77
404	LDR	Low Density Residential	19.80	79	4.00	5,895	10.7	79
405	LMDR	Low/Medium Density Res.	64.63	323	5.00	4,671	34.7	256
406	OS	Open Space	5.83	0	0.00	-	0.0	-
407	MS	Middle School	20.00	0	0.00	10,890	5.0	37
408	LDR	Low Density Residential	118.62	474	4.00	5,895	64.2	474
409	ES	K-6 School	9.41	0	0.00	21,780	4.7	35
410	P	Park	2.45	0	0.00	10,890	0.6	5
411	HDR	High Density Residential	8.14	130	16.00	1,936	5.8	43
412	P	Park	4.10	0	0.00	10,890	1.0	8
413	UR	Urban Reserve	2950.00	0	0.00	-	0.0	-
414	E	Employment	77.31	0	0.00	39,204	69.6	514
415	LMDR	Low/Medium Density Res.	20.04	100	5.00	4,671	10.7	79
416	LMDR	Low/Medium Density Res.	50.06	250	5.00	4,671	26.8	198
417	MDR	Medium Density Residential	19.15	153	8.00	3,687	13.0	96
418	OS	Open Space	4.61	0	0.00	-	0.0	-
419	C	Commercial	19.27	0	0.00	39,204	17.3	128
420	HDR	High Density Residential	8.67	139	16.00	1,936	6.2	46
421	OS	Open Space	0.54	0	0.00	-	0.0	-
422	OS	Open Space	17.20	0	0.00	-	0.0	-
423	CC	Civic Center	21.81	0	0.00	39,204	19.6	145
424	MDR	Medium Density Residential	2.78	22	8.00	3,687	1.9	14
425	C	Commercial	9.71	0	0.00	39,204	8.7	65
426	MDR	Medium Density Residential	3.99	32	8.00	3,687	2.7	20
427	MDR	Medium Density Residential	1.68	13	8.00	3,687	1.1	8
428	C	Commercial	5.19	0	0.00	39,204	4.7	35
429	OS	Open Space	1.80	0	0.00	-	0.0	-
430	MDR	Medium Density Residential	4.15	33	8.00	3,687	2.8	21
431	OS	Open Space	0.78	0	0.00	-	0.0	-
432	MDR	Medium Density Residential	2.64	21	8.00	3,687	1.8	13
460	C	Commercial	1.21	0	0.00	39,204	1.1	8
461	C	Commercial	3.17	0	0.00	39,204	2.9	21
462	C	Commercial	2.59	0	0.00	39,204	2.3	17
463	C	Commercial	1.99	0	0.00	39,204	1.8	13
464	C	Commercial	2.04	0	0.00	39,204	1.8	14
465	C	Commercial	1.98	0	0.00	39,204	1.8	13
466	C	Commercial	0.38	0	0.00	39,204	0.3	3
467	PB	Other Public	0.47	0	0.00	39,204	0.4	3
468	LDR	Low Density Residential	0.28	1	4.00	5,895	0.2	1
469	HDR	High Density Residential	1.25	20	16.00	1,936	0.9	7
470	LDR	Low Density Residential	0.50	2	4.00	5,895	0.3	2
471	C	Commercial	2.04	0	0.00	39,204	1.8	14
472	OS	Open Space	0.17	0	0.00	-	0.0	-
473	C	Commercial	1.95	0	0.00	39,204	1.8	13
474	C	Commercial	2.48	0	0.00	39,204	2.2	16
475	MDR	Medium Density Residential	2.10	17	8.00	3,687	1.4	11
476	HDR	High Density Residential	0.74	12	16.00	1,936	0.5	4
477	MDR	Medium Density Residential	1.32	11	8.00	3,687	0.9	7
478	HDR	High Density Residential	0.24	4	16.00	1,936	0.2	1
479	MDR	Medium Density Residential	0.53	4	8.00	3,687	0.4	3
480	LDR	Low Density Residential	1.08	4	4.00	5,895	0.6	4
481	LDR	Low Density Residential	2.65	11	4.00	5,895	1.4	11

**TABLE A1**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
September 12, 2005

0

**DRAINAGE DEMANDS**

file: K:\1proj\12xx\1252\GPUUsedemands081205

Sheet: landusepcl2 @ c11 to fw346

VILLAGE NO.	ZONING	DESCRIPTION	ACRES	DWELLING UNITS	DU's/ACRE	DRAINAGE DEMAND		
						Imperviousnes, 1 EDU = sf		
						sf/unit	Total, imp. acres	EDU's
482	PB	Other Public	0.23	0	0.00	39,204	0.2	2
483	LDR	Low Density Residential	2.40	10	4.00	5,895	1.3	10
484	LDR	Low Density Residential	1.75	7	4.00	5,895	0.9	7
485	PB	Other Public	0.24	0	0.00	39,204	0.2	2
486	LDR	Low Density Residential	0.69	3	4.00	5,895	0.4	3
487	LDR	Low Density Residential	0.71	3	4.00	5,895	0.4	3
488	PB	Other Public	0.43	0	0.00	39,204	0.4	3
489	LDR	Low Density Residential	1.59	6	4.00	5,895	0.9	6
490	LDR	Low Density Residential	1.68	7	4.00	5,895	0.9	7
491	LDR	Low Density Residential	1.72	7	4.00	5,895	0.9	7
492	PB	Other Public	1.99	0	0.00	39,204	1.8	13
493	PB	Other Public	1.67	0	0.00	39,204	1.5	11
494	LDR	Low Density Residential	1.62	6	4.00	5,895	0.9	6
<b>Total Wheatland GPU</b>			8205.1	12649			2202	16269

## **APPENDIX B**

## **APPENDIX C**

**TABLE C1**  
**WHEATLAND GPU**  
**PROPOSED MAJOR STREET DRAIN LINE UNIT COSTS**  
November 28,2005

file: K1252.20| Sheet: costs @ A93  
Source: Terrance E. Lowell & Associates

no. of pipes	CULVERTS and DRAINAGE SYSTEMS			PIPE Cost/LF	MANHOLE, a.			DRAIN INLETS , a.			DI to MAJOR MH pipe			HEADWALLS AND RIPRAP, b.			Total Cost rounded up \$/LF foot pipe		
	size of each inches				48" MH up to 27" pipe; 60" MH 30" to 48" pipe; 72" MH > 48" pipe			2 inlets/every 400' for pipes up to 36" (1 ea side str) No inlets on pipes > than 36" as in road section \$			12" pipe x 60 feet			1 @ each end of culvert = 2					
	UP/each	Spacing, feet	Cost/ft/pipe		UP/each	Spacing, feet	Cost/ft/pipe	UP/each	Spacing, feet	Cost/ft/pipe	UP/each	Spacing, feet	Cost/ft/pipe	UP/each	Spacing, feet	Cost/ft/pipe			
1	12 "pipe	\$ 25.00	\$ 4,000.00	350	\$ 11.43	\$ 2,500.00	400	\$ 12.50	\$ 1,500.00	400	\$ 3.75	\$ -	0	\$ -	\$ -	\$ 53			
1	15 "pipe	\$ 30.00	\$ 4,000.00	350	\$ 11.43	\$ 2,500.00	400	\$ 12.50	\$ 1,500.00	400	\$ 3.75	\$ -	0	\$ -	\$ -	\$ 58			
1	18 "pipe	\$ 50.00	\$ 4,000.00	350	\$ 11.43	\$ 2,500.00	400	\$ 12.50	\$ 1,500.00	400	\$ 3.75	\$ -	0	\$ -	\$ -	\$ 78			
1	24 "pipe	\$ 58.00	\$ 6,000.00	350	\$ 17.14	\$ 2,500.00	400	\$ 12.50	\$ 1,500.00	400	\$ 3.75	\$ -	0	\$ -	\$ -	\$ 92			
1	30 "pipe	\$ 70.00	\$ 7,000.00	350	\$ 20.00	\$ 2,500.00	400	\$ 12.50	\$ 1,500.00	400	\$ 3.75	\$ -	0	\$ -	\$ -	\$ 107			
1	36 "pipe	\$ 90.00	\$ 7,000.00	350	\$ 20.00	\$ 2,500.00	400	\$ 12.50	\$ 1,500.00	400	\$ 3.75	\$ -	0	\$ -	\$ -	\$ 127			
1	42 "pipe	\$ 90.00	\$ 7,000.00	350	\$ 20.00	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	0	\$ -	\$ -	\$ 110			
1	48 "pipe	\$ 120.00	\$ 7,000.00	400	\$ 17.50	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	0	\$ -	\$ -	\$ 138			
1	54 "pipe	\$ 160.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	0	\$ -	\$ -	\$ 184			
1	60 "pipe	\$ 200.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	0	\$ -	\$ -	\$ 224			
1	66 "pipe	\$ 220.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	0	\$ -	\$ -	\$ 244			
1	72 "pipe	\$ 270.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	16,965	200	\$ 84.82	\$ 379			
1	78 "pipe	\$ 320.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	19,910	200	\$ 99.55	\$ 444			
1	84 "pipe	\$ 400.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	23,091	200	\$ 115.45	\$ 540			
1	90 "pipe	\$ 450.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	26,507	200	\$ 132.54	\$ 607			
1	96 "pipe	\$ 500.00	\$ 9,500.00	400	\$ 23.75	\$ 2,500.00	0	\$ -	\$ 1,500.00	0	\$ -	\$ -	30,159	200	\$ 150.80	\$ 675			
<b>ROAD CROSSING MAJOR PIPE CULVERTS</b>			<b>Cost/LF</b>	<b>UP/each</b>	<b>Spacing, feet</b>	<b>Cost/ft/pipe</b>	<b>UP/each</b>	<b>2/location</b>	<b>Cost/ft/pipe</b>	<b>UP/each</b>	<b>Spacing, feet</b>	<b>Cost/ft/pipe</b>	<b>UP/each</b>	<b>Spacing, feet</b>	<b>Cost/ft/pipe</b>	<b>Total Cost, \$/LF</b>			
2	2- 48" pipes	\$ 240.00	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	15,080	70	\$ 215.42	\$ 599			
3	3- 60" pipes	\$ 600.00	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	35,343	70	\$ 504.90	\$ 1,248			
2	2- 72" pipes	\$ 540.00	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	33,929	70	\$ 484.70	\$ 1,168			
<b>ROAD CROSSING MAJOR BOX CULVERTS</b>			<b>Cost/LF</b>	<b>UP/each</b>	<b>Spacing, feet</b>	<b>Cost/ft/pipe</b>	<b>UP/each</b>	<b>2/location</b>	<b>Cost/ft/pipe</b>	<b>UP/each</b>	<b>Spacing, feet</b>	<b>Cost/ft/pipe</b>	<b>UP/each</b>	<b>Spacing, feet</b>	<b>Cost/ft/pipe</b>	<b>Total Cost, \$/LF</b>			
1	1- 5'x4' RCB extension	\$ 175.00	\$ 9,500.00	0	\$ -	\$ 2,500.00	40	\$ 250.00	\$ 1,500.00	0	\$ -	\$ -	12,000	40	\$ 300.00	\$ 725			
4	4- 6'x5' RCB	\$ 855.56	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	72,000	70	\$ 1,028.57	\$ 2,027			
5	5- 6'x5' RCB	\$ 1,069.44	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	90,000	70	\$ 1,285.71	\$ 2,499			
4	4- 6'x6' RCB	\$ 933.33	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	86,400	70	\$ 1,234.29	\$ 2,311			
3	3- 7'x6' RCB	\$ 758.33	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	75,600	70	\$ 1,080.00	\$ 1,982			
3	3- 8'x3' RCB	\$ 641.67	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	43,200	70	\$ 617.14	\$ 1,402			
3	3- 8'x5' RCB	\$ 758.33	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	72,000	70	\$ 1,028.57	\$ 1,930			
3	3- 9'x6' RCB	\$ 875.00	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	97,200	70	\$ 1,388.57	\$ 2,407			
2	2- 10'x3' RCB	\$ 505.56	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	36,000	70	\$ 514.29	\$ 1,163			
2	2- 10'x4' RCB	\$ 544.44	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	48,000	70	\$ 685.71	\$ 1,374			
2	2- 10'x6' RCB	\$ 622.22	\$ 9,500.00	0	\$ -	\$ 2,500.00	70	\$ 142.86	\$ 1,500.00	0	\$ -	\$ -	72,000	70	\$ 1,028.57	\$ 1,794			
<b>DETENTION PONDS</b>			<b>Outlet Pipe inches</b>	<b>Pipe</b>	<b>cost/lf</b>	<b>LF</b>	<b>Pipe \$</b>	<b>Acre feet</b>	<b>Volume, CY</b>	<b>Cost</b>	<b>Size, cfs</b>	<b>Number</b>	<b>4.50</b>	<b>Pump, cost/cfs =</b>	<b>\$ 35,000</b>	<b>LAND NEEDS at \$/acre=</b>	<b>\$ 200,000</b>		
															acres	Number	cost/site		
NE Detention		30	\$ 160.00	100	\$ 16,000.00		180	290400	\$ 1,306,800.00	33	1	\$ 1,155,000	22.0	1	\$ 4,400,000	\$ 6,977,800			
SE Detention		36	\$ 190.00	3500	\$ 665,000.00		390	629200	\$ 2,831,400.00	72	1	\$ 2,520,000	49.0	1	\$ 9,800,000	\$ 15,916,400			
N Detention Improve		36	\$ 190.00	100	\$ 19,000.00		30	48400	\$ 217,800.00	49	0.5	\$ 857,500	33.0	-	\$ -	\$ 1,194,300			
NW Detention		42	\$ 220.00	100	\$ 22,000.00		239	385587	\$ 1,735,140.00	44	1	\$ 1,540,000	30.0	1	\$ 6,000,000	\$ 9,397,140			
SW Detention		48	\$ 250.00	1500	\$ 375,000.00		303	488840	\$ 2,199,780.00	56	1	\$ 1,960,000	38.0	1	\$ 7,600,000	\$ 12,234,780			
<b>Channel Work, d</b>			<b>Bottom Width</b>	<b>Depth, ft</b>	<b>Top Width, ft</b>	<b>Road, ea/LF</b>	<b>Area, acres/LF</b>	<b>CY/LF</b>	<b>Low flow conc. Channel</b>	<b>Road, \$/LF</b>	<b>Fence, \$/LF</b>	<b>Low ch. \$/LF</b>	<b>Ex/eros, \$/LF</b>	<b>Land, \$/LF</b>			<b>Total Cost, \$/LF</b>		
5'	Bottom width channel	5	5.0	49.0	1	0.000562443	3.7	0	\$ 1.50	\$ 30.00	\$ -	\$ 16.67	112				\$ 170		
10'	Bottom width channel	10	6.0	60.0	1	0.00068705	6.2	1	\$ 1.50	\$ 30.00	\$ 15.00	\$ 28.00	138				\$ 220		
20'	Bottom width channel	20	7.0	82.0	2	0.00094123	10.6	1	\$ 3.00	\$ 30.00	\$ 15.00	\$ 47.83	188				\$ 290		
30'	Bottom width channel	30	7.0	92.0	2	0.01056015	13.2	1	\$ 3.00	\$ 30.00	\$ 15.00	\$ 59.50	211				\$ 320		
40'	Bottom width channel	40	8.0	108.0	2	0.01239669	19.0	1	\$ 3.00	\$ 30.00	\$ 15.00	\$ 85.33	248				\$ 390		

Notes

a. For pipe systems 72" and larger, they are assumed to be cross street culverts with an average length of 70 feet, with 2-drain inlets per system, and one manhole per system.

b. For headwalls/wingwalls/riprap the following was assumed per pipe area:

riprap	\$ 100
headwall	\$ 200
wingwalls	\$ 300
	\$ 600

c. RCB box culverts estimated box cost/foot at \$ 350 per cy of concrete.

C2  
WHEATLAND GPU  
MAJOR INFRASTRUCTURE  
APPORTIONMENT OF COSTS  
November 28, 2005

Sheet: /node/4002 @ 011 to fr346

Sheet: /book/redd2@.c11

C2  
WHEATLAND GPU  
MAJOR INFRASTRUCTURE  
APPORTIONMENT OF COSTS  
November 28, 2005

November 28, 2005

VILLAGE	ZONING	DESCRIPTION
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## VILLAGE ZONING DESC

NO.



**C2**  
**WHEATLAND GPU**  
**MAJOR INFRASTRUCTURE**  
**APPORTIONMENT OF COSTS**  
November 28, 2005

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VILLAGE	ZONING	DESCRIPTION
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NO.

10 of 10

Sheet: (nodeูoocl2 @ c11 to fr346

C2  
WHEATLAND GPU  
MAJOR INFRASTRUCTURE  
APPORTIONMENT OF COSTS  
November 28, 2005

C2  
WHEATLAND GPU  
MAJOR INFRASTRUCTURE  
APPORTIONMENT OF COSTS  
November 28,2005

Please include C2 & C11 to file 346

VILLAGE NO	ZONING DESCRIPTION	ACRES	DWELLING UNITS	DWELLING UNITS/ACRE	DRAINAGE COST ASSIGNMENT												DRAINAGE COST ASSIGNMENT												DRAINAGE COST		DRAINAGE COST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
Imperviousness: 1 EDU = 5,895 square feet												Applicable to drainage item number												by Impervious Areas		by Impervious Areas																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
sf/unit	Total imp. acres	EDUs	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	1513	1514	1515	1516	1517	1518	1519	1520	1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	1537	1538	1539	1540	1541	1542	1543	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595	1596	1597	1598	1599	1600	1601	1602	1603	1604	1605	1606	1607	1608	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620	1621	1622	1623	1624	1625	1626	1627	1628	1629	1630	1631	1632	1633	1634	1635	1636	1637	1638	1639	1640	1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	1657	1658	1659	1660	1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1

C2  
WHEATLAND GPU  
MAJOR INFRASTRUCTURE  
APPORTIONMENT OF COSTS  
November 28,2005

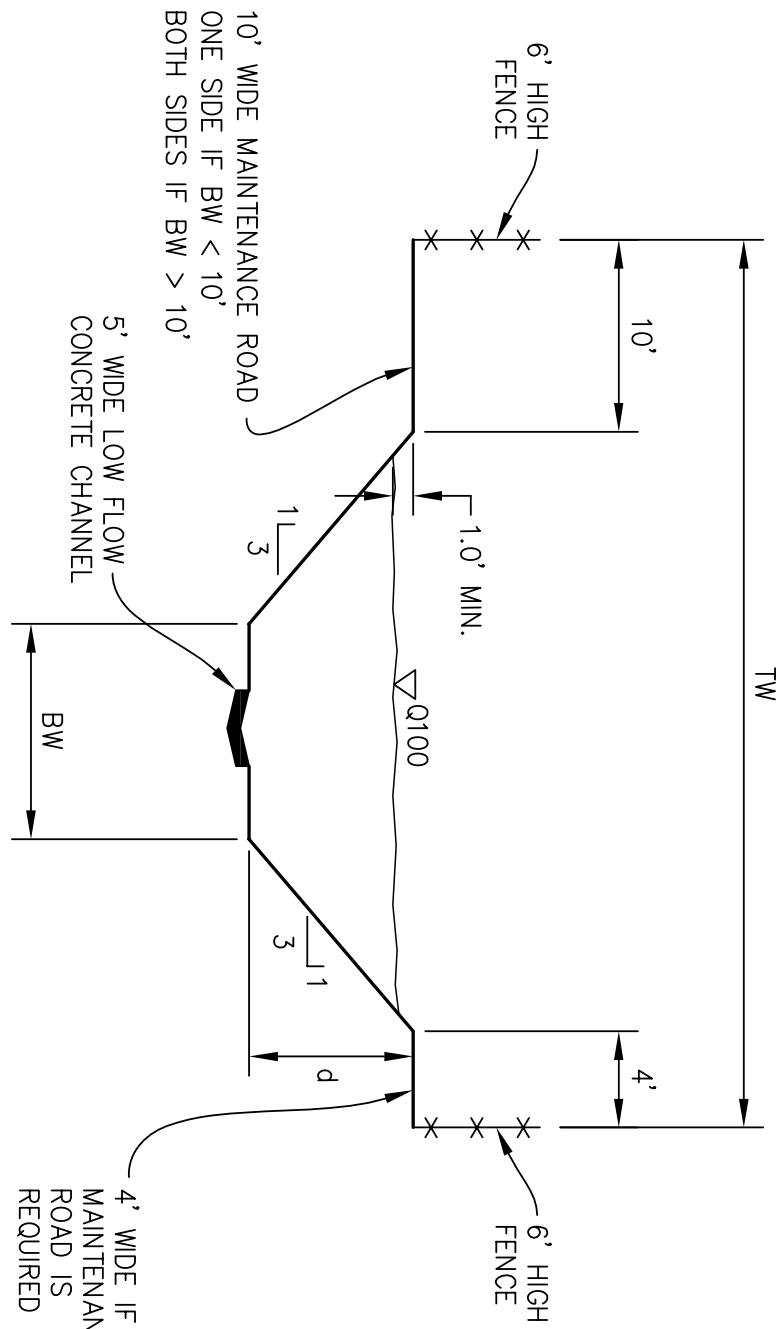
Sheet included in C 2-11 for No 346

VILLAGE NO	ZONING DESCRIPTION	ACRES	DWELLING UNITS	DWL/ ACRE	DRAINAGE COST ASSIGNMENT - unadjusted cost												DRAINAGE COST by Impervious area																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Impervious:				Applicable to Drainage Item Number								SW Det				SE Det				DRAINAGE COST by Impervious area																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
sf/unit	Total imp. acres	EDU's	EDU's	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1180	1181	1182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# WHEATLAND GENERAL PLAN UPDATE TYPICAL CHANNEL SECTION ASSUMED

DECEMBER 13, 2005

## FIGURE C1



### TYPICAL CHANNEL CROSS SECTION ASSUMED

NTS

BW 5      }  
BW 10      }  
BW 20      }  
BW 30      }  
BW 40      }

ASSUME:  $d = 5 + \text{ROUND}(\frac{\text{BW}}{13}, 0)$

TW = TOP WIDTH  
BW = BOTTOM WIDTH



TERRANCE E. LOWELL  
& ASSOCIATES, INC.  
Engineering, Planning & Public Finance  
1528 EUREKA ROAD, SUITE 100  
ROSEVILLE, CA 95661 916.786.0685